

work defining the rotational stiffnesses, more rigorous serviceability limit state formulas are provided. These account for soil stiffness, pile/shaft to bent cap connection, bent cap stiffness, and superstructure details.

(6) Development of Recommendations for rigorous analysis and design approaches Improved design and analysis techniques are proposed. A series of conclusions and possible design procedures for current and future applications are suggested.

Report Layout

This report is organized as follows:

- Chapter 2 reviews appropriate studies from the literature and summarizes the results of the NCDOT pile bent project (Robinson et al., 2006).
- Chapter 3 presents the results of the nonlinear and frame analyses for the three drilled shaft bent bridge case studies provided by NCDOT.
- Chapters 4 and 5 present the experimental set-up and results for the index and performance testing of the elastomeric bearing pads and the connection tests for the superstructure-connection-substructure system.
- Chapter 6 reduces data and results from chapters 3 and 4 for application to NCDOT projects.
- Chapter 7 summarizes the method and data used to develop resistance factors for geotechnical drilled shaft design and provides recommendations for the values of such factors.
- Chapter 8 summarizes the report and provides recommendations, design guidance, and conclusions.